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On the Use of Cocaine in the Opium Habit.

WITH A FEW PRELIMINARY REMARKS ON ITS PHYSIOLOGICAL PROPERTIES.

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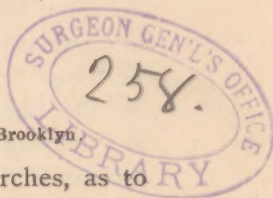
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THE most exhaustive and important researches, as to the action of cocaine, have been those made by Schroff, Fronmüller, Ploss, Moreno y Maiz, Bucheim and Eisenmenger, A. Bennet and Dr. Isaac Ott. The action and properties of erythroxylen coca by Drs. Unanue of Lima, Tchudy, Scherzer, Mantegazza, Demarlé Moreno y Maiz and Dr. Isaac Ott. Owing to the politeness of my friend Dr. Ott, I have had access to the results of the work of the observers above named, as well as to his own experiments with cocaine, and am thus enabled to present them to this society as preliminary to my own results obtained from the use of this drug in the treatment of the opium habit, in neuralgia of the pelvic viscera in women and in sciatica.

The researches of Schroff showed that $\frac{5}{1000}$ gramme per oz. in the rabbit caused slight changes in the pulse and respiration, with transitory dilatation of the pupil, whilst the same dose, subcutaneously, killed the animal in twenty-eight minutes. Epileptiform convulsions and considerable mydriasis being present, the latter yielding immediately after death. On section, the whole venous system and the ventricles were distended with blood. There seemed to be an increase of the salivary secretion, whilst there was no change in regard to defecation and diuresis. Locally, cocaine contracted the pupil. Schroff's conclusion

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presented by the author -



was that cocaine, in small doses, increased the brain functions, later depressed them, causing sleep, and belonged to the narcotics of which *cannabis indica* is an example. Fronmüller experimented with six males and eight females, using cocaine in doses of from $\frac{3}{100}$ to $\frac{33}{100}$ gramme. In four only was complete sleep obtained, and in only a few cases were narcotic symptoms present with tinnitus aurium and vertigo. With doses of from $\frac{3}{100}$ to $\frac{6}{100}$ gramme, delirium, headache, restlessness, severe chill and weakness in extremities were added. The gastric system seemed to be more disturbed, as there was observed a bitter taste in the mouth, belching and vomiting. Defecation was not increased. Uninary secretion rather lessened than increased. Pulse and respiration in beginning somewhat accelerated. The axillary temperature depressed 0.1° - 0.4° and pupil dilated.

The conclusions of Moreno y Maiz, respecting cocaine as the result of experiments on frogs, was that the conducting power of the cord was not affected, but that the nerves were attacked, that the peripheral sensibility was acted upon, that it caused phenomena similar to those produced by strychnine, such as spontaneous tetanic convulsions on the least excitation. In feeble doses it caused a remarkable excitation of sensibility, dilating of pupil and diminution of movement. The animal seemed to lose co-ordinating power. That large doses produced a diminution, then abolition of sensation, without complete loss of motricity.

In A. Bennet's experiments with cocaine he observed the symptoms already detailed, and also observed that the posterior columns of the cord were insensible after death, that the temperature was at first diminished, then increased, and permanent congestion in the ear of the rabbit. Dr. Ott's conclusions, respecting the action on the nervous system from his experiments on frogs and guinea pigs, are that cocaine in small and large doses causes loss of co-ordination and decrease of motricity. It does not paralyze the anterior columns of the cord. Cocaine in

small doses exaggerates the sensibility which, upon the least irritation, throws the animal into general convulsions, whilst large doses abolish the functions of the posterior columns and the sensory nerves. Cocaine, when gradually introduced, kills by stoppage of respiration, but when large doses are thrown suddenly upon the heart, death takes place by respiratory and cardiac arrest. Cocaine always prolongs muscular contraction and it always dilates the pupils. The effect of cocaine on the circulation is to produce a fall of pulse and blood pressure succeeded by a rise of them. That the fall is not due to central irritation of the pneumogastrics, is proved by the fact that it takes place after their division. That it is not due to the irritation of peripheral ends of pneumogastrics, is shown by the previous paralysis of them by atropia and cocaine producing a fall.

Circulation.—Experiments show that cocaine acts on the heart itself, either its imbedded ganglia or the muscular structure. Whether the muscular structure or the contained ganglia is most affected it is difficult to determine. Experiments as to the action of cocaine on the respiratory system demonstrate that the action of cocaine is an excitant of the medulla, which passes into complete paralysis. Section of the pneumogastrics does not cause any alteration in the sequence of the respiratory changes induced by cocaine. Finally, the results of the experiments of Ott show that cocaine diminishes the excitability of the motor nerves and causes loss of co-ordination.

In small doses it increases the excitability of the sensory nerves and in large doses paralyzes them. It does not affect the conducting power of the anterior columns of the spinal cord, but seems to attack the posterior columns. Cocaine depresses the pulse and blood pressure momentarily, and afterwards increases them. This effect is produced by the action of the poison on the heart itself and the vaso-motor center. It does not paralyze either the sympathetic pneumogastric or

vaso-motor center. It acts as an excitant on the centers of respiration and afterwards depresses, or paralyzes them. The pupils are always dilated. It has an action like that of veratria on the striated muscle. It depresses and then increases the temperature.

On a warm afternoon last July, I commenced experiments on myself with a 4° solution of muriate of cocaine. I injected ten minims into the cellular tissue of the thigh and lay down to watch my sensations. I experienced an indefinable sensation, something analogous to that which would be produced by the hypodermic administration of $\frac{1}{120}$ grains of atropia, and a sense of refreshing coolness. There was a perceptible dryness of the mucous membrane of the mouth, and both physical and intellectual excitation. There was a pleasant sensation irradiated over the whole body. As the result of several such experiments, I should consider it an excitant producing exaltation of nerve force, showed by an increase of intellectual power, but I did not experience Schroff's symptoms of lassitude or depression of brain functions causing sleep. I should say, from my own experience, that cocaine in small doses was an excitant increasing the brain functions, later allowing them to drop back to the normal, and a dilatation of the pupil and increase of pulse and temperature.

Cocaine in the Opium Habit.—The following case illustrates perfectly all I would say of the use of cocaine in the treatment of the opium habit, and illustrates, graphically, the magical results from its hypodermic use to relieve the terrible muscular and nervous restlessness which is apt to appear, even under the most careful and judicious retrocessive plan of treatment, by which much suffering and nervous derangement is avoided. Cases that are at once cut off from opium are very apt to be a failure as regards treatment, and it is the height of cruelty to subject a patient to any such treatment. It is a matter of deep regret that the victims of opium inebriety are generally to be found in the higher and

more cultivated classes of the community. A great many professional and literary men and women, who have special demands made upon their nervous systems every year, become morphine habitues, probably commencing its use at first for some attack of illness or nervous prostration. Some day they find to their surprise that they cannot stop its use and they gradually increase the dose, not to obtain relief from pain, but to be freed from the torments to which they are subjected when deprived of the morphine or opium. It is simply impossible for a delicate nervous woman or man either to abandon this habit voluntarily, and even physicians cannot do it. The most intelligent people contract the opium habit in spite of their intelligence, their desire and their will; and many of them end as utter wrecks of mind and body. There is, in addition to degradation of moral feeling and of impotence of will, a physical deterioration of nerve element, for the opium enters the blood and is carried by it to the inmost minute recesses of the brain, and act there injuriously upon the elements of the exquisitely delicate structures. Its finest, latest organized and least stable parts, which subserve moral feeling and supreme will, are marred. To cure the opium habitue, he must be restrained forcibly from the insane impulse for a long enough time to allow the brain to get rid of the poison, and its tissues to recover their healthy tone.

I have noticed, in not a few cases, that the tissues had the congenital misfortune to begin with the original taint of a depraved tone. They have inherited the proclivity to seek for some stimulant. The craving, if once gratified, is readily led by gratification to an uncontrollable desire. I would urge upon the medical profession the great importance of the prompt withdrawal of the drug in every case of illness, just as soon as the therapeutic indications for its use have been fulfilled, and will also suggest, that for pain in the pelvic viscera in women, that atropia, hypodermically, in doses of from $\frac{1}{120}$ of a gr. to $\frac{1}{40}$

of a gr., will stop pelvic neuralgia quite as promptly as opium will. A great many women take a great deal of morphine and chloral to procure sleep, and become habit cases in this way. If sleep must be produced, we have a near and physiologically safe sleep producing agent in *paraldehyde*, which may be given in one drachm doses at bed time, in 1 oz. syr. orange, and 1 oz. of water at bed time. From its chemical nature, I do not believe that it can do harm, while its physical action in producing sleep is akin to chloral in certainty. There is no unpleasant reaction after it. I treat chloral cases by withdrawing chloral, giving paraldehyde for a few nights, and antagonize the effect of chloral on the nervous system by giving strychnia hypodermically, commencing with $\frac{1}{120}$ of a grain of the nitrate of strychnia, and gradually increasing it until the brain takes on healthy action.

The case alluded to was that of a gentleman aged forty years, of more than unusual culture and refinement, occupying a high position of trust and honor. At the time of coming under my care he was taking six grains of morphine per diem, and could not perform his daily duties without it. I reduced the amount one-half from the start. Gave Warburg's tincture in capsule at breakfast and put patient on a Bromide mixture, in gradually increasing doses, while the morphine was gradually reduced. The formula of this mixture is as follows:

R Sodii Bromid:

Am. Bromid.	áá ʒss
Pot. Bromid.	ʒi
Syr. Hypophosphite Comp.	ʒiij
Syr. Tolu	ʒi
Aqua Menth. Pip.	ʒiiss
Liq. Pot. Arsenit	ʒi

M. Dose, from one teaspoonful upwards.

The physiological effect of this combination is reconstructive and at the same time sedative, and the

bromide cachexia is entirely avoided by the use of this mixture.

This treatment was pursued until on the tenth day the patient was taking one-sixth grain of morphia and the maximum of the bromide mixture. A great muscular and nervous restlessness now appeared. The patient applied to me at 10 p. m., complaining that he "could not sit still or lie still for a moment, much less sleep." I now administered 10 minims of a 4 per cent. solution muriate of cocaine made by Schiefflein. Before reaching his room he returned and knocked at my office door, saying that he wished to tell me that the nervousness and restlessness had entirely disappeared. He slept well. The next day hot baths, diuretics and iron and strychnia mixtures was begun to follow the bromides. Toward night the intense nervous restlessness came on, and as before, it was immediately relieved by the hypodermic of ten minims of cocaine, and uninterrupted sleep followed. The instantaneousness of the relief is something magical. The patient passes at once from a condition of great nervous restlessness into a condition of perfect comfort.

The treatment of the opium habit is rendered infinitely more pleasant to the patient by the use of cocaine, and I should now feel that I was deprived of a most important therapeutic aid, in the treatment of this disease, if I had to do without it. The case referred to made a perfect cure in five weeks, and resumed the position which he was before unfitted for.

I have also used hypodermics of cocaine in sciatica with perfect relief to the patient, making deep injections in the neighborhood of the sciatic nerve. In ovarian neuralgia I have also used it successfully, making the injections on the affected ovary.

I would caution the profession, first, not to tell the patient what they are giving; and second, not to continue the use of cocaine more than a very few days, as the patient gets to depend on it if administered for a length of time.

